

REMARKS

Claims 1-23 were examined and stand rejected. Applicants respectfully request reconsideration of pending claims 1-23, as amended, in view of at least the following remarks.

I. Claims Rejected Under 35 U.S.C. §103

The Patent Office rejects claims 1-23 under 35 U.S.C. §103(a) as being unpatentable over Applicants' admission of prior art disclosed in Figure 1 of the instant application in view of Quach, et al. "An Improved Algorithm for High-Speed floating-Point Addition" ("Quach").

Independent Claim 1

Applicants respectfully disagree with the above rejection of amended independent claim 1 and submit that claim 1 is not unpatentable over the cited references for at least the reason that the Patent Office has not provided a proper motive to combine Applicants' admission of prior art with Quach. To combine references, there must be some teaching or suggestion of desirability of the combination either contained within the references themselves or in the knowledge of persons of ordinary skill in the art. In this case, the Patent Office attempts to combine the teachings of an algorithm for floating-point addition with an algorithm for a floating-point multiplier accumulator (FMAC). However, Applicants assert that the combination would render Quach unsatisfactory for its intended purpose of combining steps of a floating-point addition algorithm because the calculations for computing signal Cin are based on the mathematical theory involved in combining steps of a floating-point addition algorithm and variables involved in floating-point addition. For example, at page 1 lines 3-6, Quach specifically distinguishes floating point addition from floating point multiplication by stating:

Despite its conceptual simplicity, FP addition in most high-speed arithmetic units today has roughly the same latency as FP multiplication. This is largely because most existing FP addition algorithms require two to three addition steps involving the significand (as explained below) a relatively time-consuming operation. [emphasis added]

Moreover, the multiplexor in Quach selects either the results of the "g" path (e.g., the "d" > 1 path where "d" is the magnitude of the exponent difference between two floating-point numbers to be added; or the effective operation for the two floating-point numbers to be added is addition path); or the result of the "l" path (e.g., the "d" ≤ 1 path). Specifically, the multiplexor selects the results of the "g" path or the "l" path depending on signal Cin which is computed based on the lower order bits of the significands of the two floating-point numbers to be added. For example, at page 3, lines 7-10, Quach states:

In the IEEE round to nearest (RTN) mode, computing $A+B$ and $A+B+1$ is sufficient to account for all the normalization possibilities to be discussed below. By selecting the results using C_{in} computed based on the lower order bits of the significands, complementation and rounding can be done simultaneously, saving one addition step. [emphasis added]

Therefore, appending the teachings of Quach to a FMAC would render Quach unsatisfactory for its intended purpose of combining the steps because the combination of the steps relies on the algorithm adding two floating-point binary numbers (see Quach, Table 5, and Example 2); and thus would not function properly if applied to the outputs of a propagate, kill, generate (PKG) generator as required by Applicants' admission of prior art. Specifically, a PKG generator produces (1) P, the product of A and B, (2) G, the sum of A and B, and (3) K, the product of the one's complement of A and the one's complement of B. That is:

$$P = A \times B$$

$$G = A + B$$

$$K = \text{complement}(A) \times \text{complement}(B)$$

(Page 4, lines 10-14 of Applicant's specification)

Therefore, Quach would be rendered unsatisfactory for its intended purpose of combining steps of a floating-point addition algorithm because Quach depends on signal Cin computed based on the lower order bits of the two floating-point numbers

to be added, while Applicants' admission of prior art is a multiplier having a PKG generator that produces three numbers (e.g., P, G, and K) which are incompatible with the addition based computations and teachings of Quach. (See MPEP §2145XD)

In addition, the combination would change the principle of operation of Applicants' admission of prior art because the teachings of Quach are based on floating-point addition of two floating-point numbers, while the principle of operation of the admission of prior art is floating-point multiplication based on an input of three floating-point numbers (e.g., such as input numbers A, B, and C to FMAC which provides the result of $A \times B + C$). Thus, combining the addition based computations and teachings of Quach, (e.g., such as computing signal Cin based on the lower order bits of the significands of two numbers to be added) with the admitted prior art multiplier would require a change in the principle of operation of providing an $A \times B + C$ result based on the three number input of A, B, and C of the admitted prior art multiplier. (MPEP §2145XD). More particularly, a practitioner in the art would not know how to use the low order bits of the significands of two numbers to be multiplied as required by Applicant's admission of prior art in order to select between multiplexor inputs as required by Quach in order to be effective in determining which multiplexor input is to be selected (e.g., such as by a rounding control unit) as required by Applicant's admission of prior art.

Hence, for the two reasons cited above, Applicants contend that that Patent Office has not provided a proper motive for combining the references cited above in accordance with MPEP §2143.01. Thus, Applicants respectfully request that the Patent Office withdraw the rejection of amended independent claim 1 under 35 U.S.C. §103(a) as being unpatentable over the cited references, for at least these additional reasons.

Dependent Claims 2-8

Applicants submit that dependent claims 2-8, being dependent upon allowable base claim 1, are not unpatentable over the cited references for the reasons explained above. Thus, Applicants respectfully request that the Patent Office withdraw the rejection of dependent claims 2-8 under 35 U.S.C. §103(a) as unpatentable over the cited references.

Amended Independent Claim 9

Applicants respectfully disagree with the above rejection of independent claim 9, and submit that amended independent claim 9 is allowable for at least the reason that a proper motive to combine the cited references has not been provided in accordance with MPEP §2143.01. Thus, Applicants respectfully request that the Patent Office withdraw the rejection of amended independent claim 9 under 35 U.S.C. §103(a) as being unpatentable over the cited references for at least the reasons noted above with respect to claim 1.

Dependent Claims 10-13

Applicants submit that dependent claims 10-13, being dependent upon allowable base claim 9, are not unpatentable over the cited references for the reasons explained above. Thus, Applicants respectfully request that the Patent Office withdraw the rejection of dependent claims 10-19 under 35 U.S.C. §103(a) as unpatentable over the cited references.

Independent Claim 14

Applicants respectfully disagree with the above rejection of independent claim 14, and submit that independent claim 14 is allowable for at least the reason that a proper motive to combine the cited references has not been provided in accordance with MPEP §2143.01. Thus, Applicants respectfully request that the Patent Office withdraw the rejection of independent claim 14 under 35 U.S.C. §103(a) as being unpatentable over the cited references for at least the reasons noted above with respect to claim 1.

Dependent Claims 15-16

Applicants submit that dependent claims 15-16, being dependent upon allowable base claim 14, are not unpatentable over the cited references for the reasons explained above. Thus, Applicants respectfully request that the Patent Office withdraw the rejection of dependent claims 10-19 under 35 U.S.C. §103(a) as unpatentable over the cited references.

Independent Claim 17

Applicants respectfully disagree with the above rejection of independent claim 17, and submit that independent claim 17 is allowable for at least the reason that a proper motive to combine the cited references has not been provided in accordance with MPEP §2143.01. Thus, Applicants respectfully request that the Patent Office withdraw the rejection of independent claim 17 under 35 U.S.C. §103(a) as being unpatentable over the cited references for at least the reasons noted above with respect to claim 1.

Dependent Claims 18-20

Applicants submit that dependent claims 18-20, being dependent upon allowable base claim 17, are not unpatentable over the cited references for the reasons explained above. Thus, Applicants respectfully request that the Patent Office withdraw the rejection of dependent claims 18-20 under 35 U.S.C. §103(a) as unpatentable over the cited references.

Independent Claim 21

Applicants respectfully disagree with the above rejection of independent claim 21, and submit that independent claim 21 is allowable for at least the reason that a proper motive to combine the cited references has not been provided in accordance with MPEP §2143.01. Thus, Applicants respectfully request that the Patent Office withdraw the rejection of independent claim 21 under 35 U.S.C. §103(a) as being unpatentable over the cited references for at least the reasons noted above with respect to claim 1.

Dependent Claims 22-23

Applicants submit that dependent claims 22-23, being dependent upon allowable base claim 21, are not unpatentable over the cited references for the reasons explained above. Thus, Applicants respectfully request that the Patent Office withdraw the rejection of dependent claims 22-23 under 35 U.S.C. §103(a) as unpatentable over the cited references.



CONCLUSION

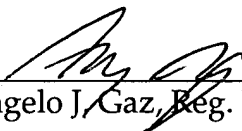
In view of the foregoing, it is believed that all claims now pending (1) are in proper form, (2) are neither obvious nor anticipated by the relied upon art of record, and (3) are in condition for allowance. A Notice of Allowance is earnestly solicited at the earliest possible date. If the Examiner believes that a telephone conference would be useful in moving the application forward to allowance, the Examiner is encouraged to contact the undersigned at (310) 207-3800.

If necessary, the Commissioner is hereby authorized in this, concurrent and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2666 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17, particularly, extension of time fees.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR, & ZAFMAN LLP

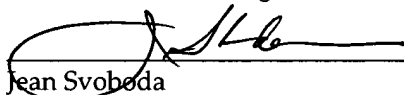
Dated: August 25, 2003

By 
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CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service on the date shown below as first class mail with sufficient postage in an envelope addressed to: Mail Stop Non-Fee Amendment, Commissioner for Patents, Post Office Box 1450, Alexandria, Virginia 22313 on August 25, 2003.


Jean Svoboda